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With the Thanksgiving game, the college foot ball season for 1896 was ended. The season has marked many wonderful games, and numerous star players have been developed and brought out. The result of the season's work on the gridiron by the O. S. U. team, however, has not been as satisfactory to most of us as we at first anticipated. This is partly due to the team itself, but mostly due to circumstances which (to the students and members of the team) were unavoidable. At the beginning of the season we were disappointed in procuring the services of the man whom we had expected to coach the team. A few days' delay resulted, until another man was engaged temporarily. This gentleman, Mr. Farrar, got the team into very good shape, and the first game of the season, with O. M. U., was won in very good style. Before the second game (which was played at Cincinnati), the regular coach, Mr. Hickey, arrived. His foot ball tactics were essentially different from

those which had been introduced by Mr. Farrar, and on account of the short time left in which to practice the new method, the game at Cincinnati was lost by a small margin. After this the team seemed to take a decided brace and, in the game with Otterbein was won one of the fiercest battles of the season. From that time most of us thought that O. S. U. was to have a winning team. But a few days after this the almost fatal blow fell by the action of the faculty in deciding that our captain and our center rush were no longer members of the team. Two other members of the team followed in their footsteps before long and the result was that the team was very badly crippled. Mr. Reed was elected captain after this, and has done excellent work in holding the team together. But we cannot but think that, had our faculty been a little more lenient, O. S. U. would have had the best team in Ohio this season.

It is with much pleasure that we have noted the improvement in the work of Townshend Literary Society this term. Townshend was formerly a technical society and the meetings were taken up with the discussion of technical subjects, but now it has become a full-fledged literary society in every sense of the word, and the work done by the members is of a high order of merit.

The work done in the literary society by the student is no small part of a completed education, and the duties of the literary society should be considered as compulsory as duties of the class room. The student who does the best work in the class room is not always the one who does the best work in the literary society or who appears to the best advantage before the public, and this rule may be applied just as

well from the other side. But the one who finishes his college course without acquiring the art of expressing himself before an audience, and doing it in a creditable way, has certainly omitted a most important part of his education.

It is in the exercise of oratory, elocution or recitation that a man learns to hold the attention of others. It is in the strife of debate that he learns to whet his wits in intellectual swordsmanship with his opponent. And thus it is that the man who does the best work in the literary society will appear with the most credit to himself before the public, and in the end become the successful citizen.

An ingenious method of detecting chicken thieves was brought to our notice quite recently.

A gentleman who is a great lover of chickens, and always keeps some fine ones, has the door of his chicken house connected with an electric bell in his bed room. One night recently he was awakened by the bell and going hastily down found a burly negro in the act of sampling his hen roost. Sambo was much surprised at being detected, for he was entirely unaware that his entrance had been announced by the ringing of the door bell. With some little trouble he was captured and sent down town. This may serve as a suggestion to some one who is troubled with chicken thieves, as it is not only novel, but practical. The expense of fitting up and maintaining such an outfit would not be great, and the chickens saved might well repay the cost. Besides, there would be great satisfaction in capturing that old-time thief, who is always so skillful in avoiding detection.

Prize Contest.

As heretofore announced in the columns of this paper, W. B. Smith

& Son, breeders of Holstein-Friesian cattle, Columbus, O., generously offered \$25 in premiums for judging dairy cattle of such breeds as might be available to the students. In competing for this contest the student judged six cows, of the Jersey herd of A. S. Bell, London, O., on Oct. 21, six cows of the Holstein-Friesian herd of W. B. Smith & Son, Columbus, O., on Nov. 5, and three Holstein-Friesian bulls belonging to the same firm, on Nov. 21. Each of these groups contain well-known show cattle from these herds. The judging was done by means of score cards, the primary attempt being to place the cattle in right order by means of the score cards. The work of the students was judged by Prof. Hunt, the score cards of the students being handed to him by number, to avoid possible bias. We give below the names of the animals judged, the number of points given to each animal by Prof. Hunt, and the order in which the cattle were put by the six students who judged them most correctly.

	SCORE CARD.	JOHNSTON.		GILMORE.		IMES.		MOONEY.		HENDERSON.		H. T. SCOTT.	
		A. B.		C. D.		E. F.		G. H.		I. J.		K. L.	
		6	19	16	31	5	4						
Dubenna, 2nd	6½	1	5	1	2	1	2						
May Sadie	7½	2	3	2	3	3	3						
Nervillett's Romp	8	3	1	4	1	4	1						
Clifford's Daisy	10¼	4	2	3	4	2	5						
Casta D. Fogis	11	5	4	5	5	4	4						
Casta Bell, 2nd	11½	6	6	6	6	6	6						
3. Iolena, of Fairmount.	3¼	1	1	1	1	2	1						
2. Vasaline	6½	2	2	3	2	3	3						
1. Adventuress, 2nd	7¼	3	3	3	4	1	3						
4. Kate Edge	9½	4	5	5	3	4	4						
6. Peterina, 2nd	13½	6	5	5	6	6	5						
5.	15½	5	6	6	5	5	5						
N. C. Pasha	5¾	2	1	1	1	1	1						
Vasaline Statesman	12¼	1	2	2	2	2	2						
Aggie Beauty	16½	3	3	3	3	3	3						
No. Wrong	4	5	4	5	7	8	7						
Points Wrong	4	10	4	8	10	10	8						
		1st	6th	2nd	3rd	5th	4th						

We show at the bottom of this table the number of cows each had out of place and also points or extent which each was wrong; for example, if a man placed the fourth cow third he would be one point wrong, but if he placed the fourth cow second he would be two points wrong, so far as that particular cow was concerned. It will be observed that 6, 16, 31 and 4, 5 and 19, had the same number of points wrong, that is, they tied each other in the extent which they placed their cattle out of order. These ties were decided by determining how much their scoring varied from that of Prof. Hunt's. On this basis the premiums were awarded as follows:

- | | |
|--|-----------------|
| 6. F. S. Johnston, Ashtabula, O. | \$10 and badge. |
| 16. Marion Imes, Bashan, O. | 7 " |
| 31. C. N. Mooney, Milan, O. | 5 " |
| 4. H. T. Scott, Fair Haven, O. | 3 " |
| 5. F. A. Henderson, McConnells-
ville, O. |badge. |
| 19. W. H. Gilmore, Millersport, O. | |

Dairy cattle is only one of the various classes of live stock which these students are taught to judge. The breeders of live stock throughout the State will no doubt be interested and pleased to learn that a considerable body of young men are each year taking an intelligent interest in, and receiving thorough instruction in live stock husbandry.

Notes.†

Mr. H. G. Winkler writes us that he is in business with his father at Hanging Rock, O. He is in the fruit and vegetable business, and says he is doing well.

Mr. F. B. Roscoe sends us his subscription to the "Student," and says: "I want to take the "Student," as I wish to keep in touch with the institution. My occupation, since I left the University, has been farming. I shall watch with much interest, the development of

the University, and especially the Department of Agriculture."

Mr. Oscar U. Reed writes us from Sunbury, O.: "Am employed as butter maker and superintendent of the Sunbury Co-operative Creamery Co."

Columbus Horticultural Society.

The Columbus Horticultural Society is one of the oldest distinctly horticultural organizations in the State. At a meeting held April 10, 1845, it was resolved to organize, and on May 12, 1845, the Society was launched with a full set of officers. Bela Latham was chosen president; G. W. Andrews, treasurer; Joseph Sullivant, recording secretary, and M. B. Bateham, corresponding secretary. At this time there were only four State Horticultural Societies in existence, viz., Massachusetts, Maine, New York and Pennsylvania. There were no national organizations.

At the recent meeting of the Association of Agricultural Colleges and Experiment Stations, held in Washington, D. C., a committee of five was appointed by the President to meet and take official action in adopting a standard form and method of procedure in seed testing.

This action was taken in accordance with a memorial which was prepared and presented by the directors of the State experiment stations.

The object of the memorial, as stated in the opening paragraph, is as follows: "The undersigned directors of American Experiment Stations, recognizing the benefit to be derived to agriculture from an experiment in the quality of seed merchandise, and by enabling seedsmen to offer a guarantee of specified quality, request the Association to appoint a committee of

experts in seed testing to devise and adopt a standard form of seed testing, apparatus and method of procedure for use in all American stations, who shall hereafter publish seed tests, to the end that all such work shall be strictly comparable and that seedsmen may guarantee the quality of their seeds, according to the official method.

The following committee was appointed: Dr. E. H. Jenkins, New Haven, Conn.; Prof. F. W. Card, Lincoln, Neb.; Prof. W. R. Lazenby, Columbus, O.; Prof. G. H. Hicks, Washington, D. C.; Prof. G. McCarthy, Raleigh, N. C. This committee is now at work and will hold a meeting in the city of Washington at an early date.

The "Army Worm".

(*Leucenia unipuncta*.)

BY JAMES S. HINE.

Leucenia unipuncta.

By James S. Hine.

As I was permitted to observe the destructive habits of the "army worm" the past summer, I take this opportunity to give a few notes regarding it.

This insect is present every year, but not usually in destructive numbers. Only twice can I remember of its being seriously destructive in northwestern Ohio. In 1875 the first outbreak of importance occurred. The second during the season just past.

Of the destruction caused by the army worm in 1875 I can say but little from personal observation. From the Third Report of the U. S. Entomological Commission, we learn that Hancock county lost 50 per cent. of the oats crop. "Oats were also badly damaged in Henry, Van Wert, Fulton, Lucas, Mercer and many other counties of the

State." Many cut oats that year before they were fully ripe, and some fields and parts of fields were not worth cutting at all. The larvæ passed from one field to another in armies, and were the cause of comment and uneasiness from farmers generally. Many thought corn was destined. But before much damage was done to the latter crop, the worms pupated and their ravages for that season were at an end. Many predicted that they would be more injurious the following season, but, although some were seen, no damage was reported in Fulton county as a result of their work. They do not appear when they are expected, and consequently when they do come people are not prepared to combat them.

The summers of 1894 and '95 were notable for continued dry weather. The past season was a very wet one. Consequently meteorological conditions were favorable for an outbreak of the "army worm."

Riley's observations, covering a long period, show conclusively that "army worm" years always follow dry seasons, but the seasons in which the worms appear in destructive numbers do not necessarily have to be wet.

Fitch claims that, in order to have "army worms" abundant, there must be a wet season following a dry season, but Riley cites instances where they were injurious in dry seasons following dry seasons.

During the first days of July it was reported from Williams county and western Fulton that the "army worm" was doing serious injury to oats. This led farmers to make observations, and soon it was known that they threatened destruction over large areas.

When the worms were first ob-

served they were nearly full grown and in condition to do the most damage possible. They began work on the lowest ground, consequently there the oats were damaged most. Their manner of working on oats is one of the most destructive conceivable, as they cut off the pedunkle and let the grain fall to the ground. In some whole fields and parts of fields the grains were eaten off in this way until only the naked straws were left standing.

It was reported that the worms on the march gave some trouble to bicyclers. On hard roads so many larvæ were crushed by riding over them that the tires became wet and slippery, sometimes causing the rider to fall.

The worms did not stop eating when the oats were cut. They congregated in the shocks and continued eating. Wet weather prevented the farmers from stacking as soon as they otherwise would, consequently most of the larvæ had changed to cysalids before oats could be put out of their reach. Many pupated in the shocks, others an inch or so below the surface of the ground, and still others under sticks and stones. When the sheaves were handled many pupæ would drop from them to the ground, so that great numbers could be found near where a shock had stood.

Although all damage, of consequence, was done to oats, the worms were common on a variety of plants, such as tomato, corn, cabbage, grasses and various kinds of weeds.

The moths appeared in abundance during the first days of August. Decaying apples seemed to attract them, for at sundown and after, swarms of the adults were observed flying under apple trees

where lay plenty of decayed fruit.

Chickens seemed to have a particular liking for the moths. A brood of half grown chickens were in the habit of roosting near a particular sweet apple tree where these moths flew abundantly every evening. Certain ones of the brood developed a liking for the insects, for they would remain out until it was almost too dark to see them, plainly for no other purpose than to procure what food they could by catching the moths in question.

Regarding the number of larvæ that will appear next year, one can only speak with uncertainty. From past experience it would seem that they are not likely to appear in injurious numbers two years in succession, but as there is no conclusive proof to base a sweeping statement upon, such better not be made.

SUCCESSFUL MEETING

Of the Columbus Horticultural Society in Westerville—Over Thirty Varieties of Apples on Exhibition.

The last regular meeting of the Columbus Horticultural Society was held in the town of Westerville. The attendance was large and the program equally interesting and instructive.

After hearing the reports of the various standing committees the question of "Varieties of the Apple" was brought forward for discussion. The subject was opened by President Lazenby, who spoke substantially as follows:

Although the apple is the best-known fruit of north temperate zones, and many of its different varieties are readily recognized, there is a great lack of definite knowledge regarding the essentials or requisites of a perfect specimen of this

famous orchard product.

What is an apple structurally? It is not, like the peach or plum, simply the matured ovary or pistil of the flower. It is not the developed receptacle like the strawberry. It has a structure peculiar to itself. If we examine the flower of any of our strictly perennaceous fruits we will find that the ovary is made up of fine carpels, which are united, forming a single five-celled ovary. The calyx of the flower is adherent to this ovary. After the blossom is fertilized and the young apple begins its development, we find that it is the calyx which grows the most rapidly and forms the larger part of what is edible. The receptacle, or end, of the flower stem forms the remainder, while the ovary proper is simply the core, that is the papery carpels which surround the seed.

In studying and describing varieties of the apple, the external characters, including firmness and weight, first claims our attention. Then comes the internal. The principal external characters are shape, size and color. In addition to these, however, there are the cavity and basin, including the stem and eye, and the skin, with the dots thereon.

The principal internal characters are the core, with its seeds, and the color, texture, richness and flavor of the flesh.

The qualities or characteristics that now seem to be in demand in apples are: (1) bright color; (2) good size; (3) uniform shape; (4) spicy flavor; (5) little waste, that is, small core, few seeds and a thin skin; (6) good cooking qualities; (7) good keeping qualities. The tree should be healthy, vigorous, hardy, long-lived and productive.

Although there are an almost infinite number of varieties, the ideal or perfect apple has not yet been produced. However, occasional specimens are seen that appear to

fall little short of perfection.

How many really good varieties of apples are there in cultivation in the United States? In 1892 there were 833 different named varieties offered for sale by nurserymen, but this is only a fractional part of the total number of varieties in existence.

Ever since the organization of the American Pomological Society, in 1850, it has been the duty of a standing committee of that body to examine the lists of fruit under cultivation and report the names of such as were deemed worthy of general use.

In 1852 the first formal report was presented, and 32 varieties of the apple were listed. The list of 1891 contained 339 varieties. Of this number only 22 are of foreign origin, although hundreds of foreign varieties have been tested in this country.

The following list of apples was presented as one containing the best varieties for central and southern Ohio:

Summer Apples.—Early Harvest, Early Strawberry, Summer Queen, Summer Pearmain, Red Astrachan, Yetopski.

Autumn Apples.—Cooper, Duchesse of Oldenburg, Fall Pippin, Gravenstein, Jersey Sweet, Lowell, Maiden's Blush, Nonpareil, Porter, Rambo, Smokehouse, Wealthy.

Winter Apples.—Baldwin, Ben Davis, Fallawater, Grimes' Golden, Golden Russet, Jonathan, Northern Spy, Peck's Pleasant, Rawle's Janet, Rome Beauty, Roxbury Russet, Smith's Cider, Stark, Tolman Sweet, Western Beauty, White Pippin, Willow Twig, Winesap, Yellow Belleflower, York Imperial.

Poultry Department.

One purpose of our poultry department is to carry on experi-

ments, and our house is constructed with that in view. Two years ago Mr. Spiers obtained very satisfactory results regarding the feeding of green bone, and we are carrying on an experiment now having in view the respective merits of green ground bone, Armour's ground bone and meat and Armour's pure cracked bone.

We are always ready to receive any suggestions along this line of experimentation, and we invite our readers to make such suggestions.

EGG PRODUCTION.

Is It Likely to be Overdone?

As a general thing we are not in the habit of considering the eggs handled in this country as representing any considerable amount of money. A large per cent. of them come from the farm, not as one of the main crops, due to the forethought and supervision of the farmer, but in many cases the result of accident—an accident that the hen found something to eat with which to make an egg. I would rather think this the exception than the rule, however, for farmers do not usually forget to feed the animals upon their farm. But it is seldom that they feed their chickens with the expectation of receiving much in return in the way of eggs. We find that they are brought to market, a dozen here and a dozen there, and we find that the consumers, as a general thing, buy only a dozen or so at a time. It is because of this fact that they are handled in comparatively small quantities. But little thought is given to the value of them taken as a whole. It would be a difficult matter to ascertain the amount of eggs produced in the United States, together with their relative value, but we have an estimate, given in

the United States Census Report of 1890, Department of Agr. Statistics, placing the production of eggs for the year at 819,722,916 dozen. At an average price of 10 cents per dozen we would have \$81,972,291 as their value. The demand for this apparently inconspicuous article is so great that we are unable to supply it in this country, and we annually import large quantities. In the last six years we have imported to the value of \$4,699,392, an average of \$783,232 each year.

Within the last few years a marked increase in poultry lines has been noticed, and as our production of eggs increases, we often hear it confidently asserted that, like the dairy business, the egg business will soon be overdone. But the prices appear just as good now as ever, and if the time comes that our production exceeds the demand, we will have a chance to export to other countries, some of which, the United Kingdom especially, import immense quantities.

But the food value of eggs is such that we believe any noticeable decrease in the average price would create a greater demand for them, thus keeping their price up to such a figure that it will still pay to produce them.

Bacteria in Milk.

Milk is a perfect food for all the higher forms of animal life. Containing, as it does, so many of the life-sustaining elements, it is not strange that it is found to be a perfect food; or suitable medium for the growth and reproduction of numerous species of the lower organisms, or germs known as bacteria. That these germs do exist in unclean milk in large numbers, none will deny. That the milk is a suitable medium for the development of certain species of bacteria which

are dangerous to health, science has authenticated.

Of the dangerous species which develop in milk at a rapid rate may be mentioned those which cause the following well-known diseases: Typhoid fever, cholera infantum, diphtheria, scarlet fever and many others, which produce functional disturbances not of a specific nature.

While the much-dreaded tubercle bacilli does not reproduce, to any great extent, in milk, yet it is capable of living in this medium and while this condition of affairs lessens the danger of infection, it does not wholly eliminate it.

Another specific germ which finds in milk a suitable medium for reproduction, is the one which causes hog cholera. This germ may not affect mankind directly, but it is probable that it, as well as many others, do affect him indirectly by infecting the domestic animals on which the people depend for so large a portion of their food; as whole herds of swine have been known to contract hog cholera by being fed on skim milk from the the creameries.

The question naturally arises, How does the milk become contaminated? We find this to be brought about in various ways. The germs may be introduced into the milk direct from the glands of the cow. Especially is this true in cases where the milk glands are affected by any of the so-called contagious or infectious diseases. They may also be introduced into the milk in many indirect ways. The soiled hands and clothing of the milkers is a common source of infection. If the vessels into which the milk is drawn are not kept perfectly clean, they become important factors in disseminating the infection. Another way in which they are often

introduced into the milk is by being shaken from the hair and skin of the cows while the milk is being drawn; especially is this true of cows which are housed in filthy stables, and not curried or cleaned before being milked. Some few organisms are undoubtedly introduced from the atmosphere, but where the air of the milk rooms and stables is kept fresh and free from dust and obnoxious gases, the number of germs which find their way into the milk from this source is of small significance, for they are usually of the harmless species.

It is evident, then, that the principle sources of infection are conditions which may be largely controlled by the dairymen, and the consumer should demand, and see to it, that the milk which they use comes from a dairy where the herd consists of healthy animals, and where the sanitary condition of the stables and dairy apparatus are scrupulously looked after. For, in a general way, the statement may be made, that where filth and foul gases exist, there will be found the largest number of the dangerous species of bacteria.

It should be borne in mind that the number of germs which find their way into the milk from any one of these sources is comparatively small; but having found their way into a medium so conducive to their growth and reproduction, they increase with alarming rapidity, and milk which originally contained only a small number will, after a few hours, contain myriads of these germs.

Thus, milk from filthy dairies often becomes the medium for a widespread diffusion of disease, and in some cases, death, instead of being the healthful, nutritious product it should be, and which it is when produced and taken care of by

the intelligent, painstaking dairyman. The manner in which bacteria affect dairy products is a subject of importance and one which should receive the attention of the milk producer, as well as the creamerymen. M. I.

Animal Mechanics.

[Continued from last month.]

The croup should next receive our attention. This region, perhaps better known as the rump, extends from the loins to the buttock, occupying all the space between and back of the haunches (hips, or points of the ilium), to the buttocks. The length, width, direction, muscular development and particular forms of the croup should be carefully observed.

The length of the croup, for all purposes, should be considerable. By actual measurement of horses having regular conformation, it has been found that the length of the croup equals the distance from the summit of the head to the angle of the mouth (the bit space). A good length of croup insures length of muscles of the croup—those muscles which are attached to the thigh and leg, thus giving speed; and power, also, if the muscle is of great volume.

The Width of Croup.—This is ascertained by taking the distance between the haunches and also the distance apart of the buttocks. The width of the croup in the skeleton, exceeds its length; but the opposite is often the case in the living animal, owing to the thick muscles of the buttock. The width of the croup is an index to the volume of the muscles of that region, and consequently an index of their power—the contractile units being more in a wide, than in a narrow croup.

The Direction of the Croup.—By this is meant the direction of the

axis of the croup, which agrees almost exactly with a line from the haunch to the point of the buttock. This line is called the ilio-ischial line.

Muscular Development of the Croup.—A croup should be not only well muscled, but should be firm dense, and well outlined; without these qualifications a croup would be deficient in power.

In particular forms of the croup the length and breadth, the direction of the larger axis, the direction of the superior line of the croup, muscular development, and the movements are the leading factors. As mentioned before, a croup with great length and breadth, especially if the haunches and the points of the buttock lie in planes which are nearly parallel, and if well muscled is one of power and utility. When a croup is wide in front and narrow behind, the horse is said to be "mule-like," or "pointed."

The obliquity or direction of the larger axis of the croup was mentioned above, but it may be said here that a croup too horizontal will mean a weak back to carry burdens and it will also lack power. The vertical axis of the posterior limb will be placed too far backward in an extremely horizontal croup. In a croup too oblique, the effect will be reversed: the union of the posterior members with the spinal column will be stronger because more vertical, and hence it will be able to carry heavy burdens, but the force of impulsion will not be transmitted so effectually, because it will be directed upward, rather than forward; also, the vertical axis of the posterior member will be placed far forward, placing the limb too far under the trunk. A croup too oblique is called "slanting," "low," or "cut-off."

Direction of the superior line of the larger axis.—If the sacral spine is very prominent, so that the croup slopes downward, backward and outward, the croup is called "sharp." This is no defect, except when accompanied by a narrowness of the buttocks.

Development of the Muscles.—This varies according to the race. In horses of the lymphatic type a longitudinal gutter is often seen on the median line of the croup. Such a case is called a "double" croup, and it is efficient for force, but it hinders speed, because (as this form means wideness of the croup), it occasions too much lateral displacement of the center of gravity—a wobbling motion resulting. The croup is called "angular" when the sacral spine extends above the surrounding muscles. This is not to be considered defective if the muscles are developed in harmony with the bones.

The Movements of the Croup.—The croup should propel the trunk evenly and without swinging from side to side. When this condition is not fulfilled, the motion is called "oscillating," and "rocking" when more exaggerated.

The Breast.—This region is situated below the base of the neck and limited by the front borders of the anterior members and the inter-axillary space. This region should be wide, but yet it should be proportional to the volume of the body. A wide breast may not always insure a wide chest, owing to the manner of attachment and muscular development of the anterior members. A narrow breast is to be considered defective for all purposes. It is called "closed in front."

The Abdomen.—The abdomen is an index, to a certain extent, of the animal's state of health and also its weight and volume influence loco-

motion. As to volume the abdomen should be proportional to the size of the animal; it should also be elastic and yielding to digital impressions. In animals of slow movement its vertical diameter (measured from the center of the back) generally equals the length of the head. That conformation is most desirable when the abdomen continues the external form of the thorax. When the abdomen is defective in volume the indications are that the assimilation powers of the animal are impaired, or that he is starved. Too voluminous an abdomen indicates an animal of a ravenous appetite, or that he was fed on large quantities of innutritious food. The form of the abdomen is generally cylindrical in well nourished animals. When the underline passes obliquely backward and upward, giving the abdomen a choked off appearance, it is called "greyhound-like." This is defective—"too much air passes under him." If the abdomen is pendulous it is also defective, as it indicates sluggishness, ravenous appetite and a predisposition to be sway-backed and short-winded.

The Costal Region.—This region includes the ribs and the sides and is limited by the back, flank, abdomen and anterior limbs. The form of the chest should be such as gives the greatest volume with a given external surface. This is accomplished more completely as the chest approaches the form of a perfect cylinder. Of course, in no animal is this the case, but many animals are convex-ribbed, while others are flat-ribbed. It is evident that the round ribs are the most desirable. The ribs should be well separated, long, and should have a good curvature. The defects of the ribs are: Flat (not much curved), short, little inclined backward, and

little separated. The chest in general should be high, wide and long. The height is measured, vertically, from the withers to the inferior surface of the sternum. The height is directly proportioned to the length of ribs. The width of chest is the result of the curvature of the ribs. It is measured from the middle ribs, transversely, to those of the opposite side. A high chest is spacious only on account of its proportional width, yet the development in height very often is accompanied by a correlated development in width. Therefore, large thoracic diameters are to be desired. The length of the chest is measured from the point of the shoulder to the middle of the last rib. This length depends upon the distance between the ribs and upon their inclination backward. A long chest is to be desired, but it is incompatible with a short back.

Defects of the Chest.—When a chest is wanting in height the horse is said to be “too far from the earth;” when wanting in width, “narrow;” when wanting in length, “short.”

P. B.

Seasonable Hints.

L. W. LIGHTLY, EAST BERLIN, PA.

Now is the time to overhaul the cow stables and get them in order for the winter campaign. See to it that all cracks are closed up, window lights replaced and the windows cleaned so as to admit the light and sunshine, purify the inside air and give comfort to the cows.

Ventilation, of course, is necessary, but don't try to ventilate the stable through cracks in the weather boarding and broken window lights. There are 500 cows hurt by excess of ventilation, or abuse of it, or cold, where one is injured by deficient ventilation. Let

frost never enter your cow stable. If you have old stables that you don't feel like spending much on, get some boards sawed or purchase some cull lumber and building paper and at very little expense you can tighten it up nicely.

When I started dairying I had an old log barn, and the blowing snow covered the whole stable. I got some boards sawed and double boarded it, with a 4-inch space filled with sawdust. I cut out some logs and fitted in a few sashes and secured light. After that my stable was 35 degrees in the coldest weather; and I will assure you the cows appreciated my efforts for their comfort, as it took 10 per cent. less food to produce 20 per cent. more milk, and the cows looked contented and sleek. It was not, of course, as convenient as my new stable, but it was a vast improvement on the old one and the cows were comfortable in it.

It pays well to make the cows comfortable the year round. Give them shade in the summer from the scorching sun and protect them from the wintry blast. Make everything as convenient as possible while you are at it. It will save you some time every day which you can very profitably, as well as comfortably, use during the cold weather in reading some good papers and books devoted to your occupation; and you will enjoy it all the more when you know that your animals are as comfortable as yourself behind the big kitchen stove after a hearty dinner.

Prepare plenty of dry bedding and when the temperature gets low bed the cows plentifully. That keeps them warm and is a great comfort to them.

Though you feed the cow plentifully, if you compel her to stand out alongside the strawstack, humped

up and shivering, all day long, she must use the food for fuel to keep warm, and that is dollars out of your pocket. She cannot use the food for fuel and for milk and butter production at the same time. You can take your choice.

Did you make provision for water for her to drink for the next three months when the ground is ice bound? Do you cut a hole in the ice down at the stream 200 yards or more from the barn and drive her down daily to fill up on water at 32 degrees? I had such experience and know what it costs. I now draw the water 180 yards from a spring, with a force pump, right under my barnyard roof, and the cows can drink in comfort, rain or shine, water at 54 degrees on an average from the spring.

Remember a cow in full flow of milk drinks 50 per cent. more water than when dry. Did you ever calculate how much it costs to warm that water in the the cows with \$20 per ton fuel? If not, take your pencil and do so now, and you will at once decide that it is economy to dig a well or draw water from a spring right to the door, or possibly use a water heater to take the icy chill off before the cow is allowed to drink it. Apparently these are little things, but of such is the entire kingdom of dairymen. Unless you pay attention to little things the larger ones will never call for your attention.—N. Y. Produce Review.

Lessons of the Soil—Farm Drainage.

The biological side of soils is developing more and more every day, that is, the more we study the soil, the more we find out about it in this respect, that it is not the inert, lifeless body that many suppose it to be. On the other hand, it is being found out that it is a living body, with something to do besides sim-

ply furnishing a cold receptacle for the seeds and plants. An important factor in connection with an active soil is perfect drainage. In a recent bulletin from the United States Department of Agriculture, we note the following points:

“Soil drainage is the removal, either naturally or by artificial means, of the surplus water from the soil; hence a drained soil is one which is moist but not saturated with water. All soils used for the production of the plants most prized by the farmer, gardener or fruit-grower must possess, in addition to other necessary elements, a certain quantity of water, or they will not yield the largest possible returns to the cultivator.

“This water is usually termed moisture, and soils in which the proper proportion exists are commonly called dry soils, to distinguish them from those which contain a surplus of water, and are called wet soils.

“The farmer, therefore, in speaking of a dry soil does not mean one which is devoid of water, but one which contains the quantity of moisture best adapted to produce the most desirable growth of his plants, while the term, “wet soil,” indicates, one that contains more water than is needed, which acts in such a way as to prevent plants from reaching perfection.

“A perfectly dry soil is dead. It is worthless for producing plants, except those which derive their nutriment from the atmosphere alone. A soil which is completely saturated with water will produce nothing but aquatic cereals and other valuable products. The nutriment which plants take from the soil is in liquid form only, it having been prepared by chemical action brought about by the union of heat and moisture with the elements

present. An excess of moisture reduces the temperature, excludes the air and dilutes the plant food, thus retarding or entirely stopping the growth of the plant as effectually as is done when the soil is too dry."

Raising Mushrooms.

A use for horse manure by which it is made all the better for the field or garden in the spring is raising mushrooms. Any location is suitable that is dark, dry and has a uniform temperature of 40 to 50 degrees. I have recently planted a bed in a shed. The manure was taken fresh from the stable every day, put on the bed and thoroughly forked over. When enough had accumulated to make the bed a foot or more deep, it was all worked together for three or four days, till the heat was evenly distributed and reduced to about 90 degrees. In pitching it over, any litter that appeared was picked out, much of it was taken up by the fork and could be scraped off.

When in the right condition it was tramped down hard and holes made every six or eight inches apart by inserting a stick two or three inches deep. In each hole a piece of spawn the size of a walnut was planted and securely covered. In a little more than a week the spawn permeates the mass, as can be told by the mushroom odor given out. Then it is covered with loam from the field or garden and litter scattered over this.

It will be nearly two months before the mushrooms appear, but thereafter they afford a continual feast. The season is over in April and begins again in September.

In all the literature on mushroom culture, caution is emphasized against too much moisture in the bed, as that is fatal to success.

But one can err in the opposite direction. In my first effort the materials were used so dry that the spawn did not start for a whole year, when part of the covering was removed and it leaked down and moistened the bed, then they grew as if just planted.

Manure taken fresh from the stable as above stated, is of the right consistency, the medium between soggy and powder dry, when it packs without emitting moisture. The loam covering, if very dry, should be lightly sprinkled with tepid water. All the labor in mushroom culture comes at once, followed closely by the fruits, which are delicious indeed.

Why does not every family have a mushroom bed? The bricks of spawn, weighing twenty ounces, cost from twenty-five to thirty cents by mail, can be procured at any of the great seed houses. One brick makes forty pieces and will plant about twelve square feet. They are so hard I saw them into strips one way and break up the strips.

M. A. HOYT.

Permanent Grasslands.

Prof. W. H. Brewer, of Yale University, recently delivered a very able lecture on the value, not only to the owner, but to the country, of permanent grass lands. He cites proof of this in English pasture lands which have been in grass for 400 to 600 years. He closes as follows:

In discussing the merits of permanent grass lands, I do not wish to be misunderstood as to the line of argument. I do not wish to underrate the other sources of forage or the value of these other forms which are produced in crop rotation. Seeded grass lands, clover, alfalfa, the various other crops grown for forage, have each their

own value and will always be largely and profitably used. Connecticut farmers cannot do without them. I am discussing only one phase of the very large subject of forage for farm stock, not the relative value of each. I am discussing the influence of this one of the three ways in which broad acres are devoted to a continuous use for a long series of years. The three ways are by orchards, wood lands and grass lands. Of the three, probably the last is the most permanent, certainly more so than orchards. In nature and in the countries of our older civilization, grass lands are as enduring as even the forests are, probably more so, and are certainly more closely connected with farming industry. This stability and permanence carries its conservative influence into the business of the people, and its permanence into their prosperity.

The improvement of the many breeds of live stock in Great Britain, particularly of cattle and sheep, is intimately related to the permanent grass lands there. The Shorthorns, the Ayrshire, Devonshire, and Galway among cattle, the Southdowns and Shropshires among sheep, each were evolved in connection with the pastures of the several districts.

The colonists to America had to make the pastures; there were no old pastures of tame grasses, and before old kinds could be established the generation had passed away that was familiar with them in the fatherland. The very term, "grazier," died out here, although it continued in use abroad.

The competition of late in the west destroyed our cattle industry here, and the public sentiment in our cities and manufacturing towns prevent our increasing our flocks of sheep, but I believe that both will in time come back. The

natural pasture lands of the west are now all occupied. The dairy interests will doubtless continue to grow in this State, and so the matter of permanent grass lands will continue to increase in importance here.

I will conclude this lecture by quoting the words with which I closed the other lecture alluded to, given before this board 28 years ago, only substituting in the quotation grass lands for pastures: "I am convinced that the more it is considered the more important will seem this matter of well-kept and permanent grass lands, clothing our hills, adorning our valleys, beautifying the landscape, furnishing food for the present generation, and promising permanent wealth and prosperity for the future."

ADDRESS OF W. C. TABER

(ASSOCIATE EDITOR N. Y. PRODUCE REVIEW),

Before the Iowa State Dairymen's Convention at Marshalltown.

Mr. President, Ladies and Gentlemen of the Iowa State Dairy Association:

I bring you greeting this afternoon from the Mercantile Exchange and the butter trade of Greater New York.

The number of these great dairy conventions being held in the west and northwest this year makes it impossible for many of our merchants to attend all of them, but I am glad that New York is represented here to-day by eight commission merchants, fifteen solicitors and two newspapers.

There is no better place to discuss the subjects that are of such vital interest to the dairy industry of our country, and I have gone far astray in my judgment if the twentieth annual convention does not

result in material and lasting good to both the makers and handlers of the product which has so largely made the great State of Iowa second to none on the American continent, and the admiration of the older countries beyond the seas.

In asking me to speak on the subject of preparing and packing butter for the New York market, your secretary has given me some latitude, so that I may diverge considerably from my text before I get through.

Market conditions and needs are constantly changing, not with the regularity of the passing seasons, but generally under a slower process of evolution. Methods of doing business in vogue a quarter of a century ago look crude and imperfect to-day; so also do the making, packing and marketing of dairy products, and men who do not recognize and adjust themselves to the newer requirements get left in the struggle for supremacy. I want to impress this upon you, and also to suggest that when you go back to your work in the creamery, or on the farm, you take the motto of the Empire State as your watchword—"Excelsior!"—higher quality and a higher standard of perfection in every department of your business.

There has been a good deal of just criticism because some of our large markets have not given extra quality the place that it deserved in comparison with the usual run of fine butter. Under the stress of competition firsts have often been made to sell in place of extras, and the latter have not commanded a price that would seem to be much of an inducement to make perfect quality. This was, and is still, due in large measure to certain peculiar and unnatural conditions, which have as yet found no proper adjustment. It does not result from ma-

nipulation of quotations, nor from any influences of that character. There never was a time in the history of the trade when shippers had as full and accurate information of selling values and all the factors that control the great markets of the country, and the widest dissemination of such knowledge must tend to a still more intelligent distribution of the product of all sections. But I wish to say most emphatically that the time is rapidly approaching when strictly fancy quality will always sell more quickly and bring more money than the butter that commonly passes current as fine. Then the importance of making your creamery equal to the best must be apparent, and every possible effort should be directed to that end. The responsibility of doing this rests largely with the butter maker, and every facility should be given him for his work. The time has gone by when an incompetent or second-class butter maker has any place in the creamery beyond an ordinary helper. It is a costly place to try experiments. You want a man at the helm who has a practical and technical knowledge combined, and who has the brains and genius to master the elements with which he is working, so that the finished product shall bear the most crucial test.

But assuming that your plant is well equipped, that the butter maker is fitted for his position, and that the butter as it comes from the churn needs only the proper manipulation to prepare it for market, I will tell you what some of the requirement of the New York trade are.

The color of the butter is of great importance. For years there was a prevailing opinion that consumers wanted a deep yellow, almost red-

dish color to their butter, and butter makers tried to give them just what they wanted. But this requirement, if it ever existed, has changed very much, and there is now a growing demand for pale color. High colored butter does not look well at best, and the addition of so much coloring matter imparts a foreign flavor. Our home jobbers seldom complain of too light color, and the constant call from the export trade is for pale butter. "I can't understand," said a well-known shipper recently, "why the Americans persist in painting their butter red." This is a defect too easily remedied to exist any longer, and it should claim the attention of our butter makers at once.

The question of proper salting is much more difficult to settle. People's tastes differ widely. Some believe that salt brings out the flavor of the butter, and so they want plenty of it. Others want the rich, creamy flavor of the butter and do not like to have it buried in salt. There is, however, an increasing tendency toward milder flavors, and with a vast majority of the consumers who get their supplies from the New York markets lighter salted butter is preferable. Of course our exporters object to heavy salting. In England, as well as in the best dairying sections on the continent, three per cent. of salt is considered ample. Some of the recent shipments of fresh creamery from the Canadian provinces have carried only two to three per cent. of salt, and they pleased the English buyers. No rule can be followed absolutely. The retention of salt depends a good deal upon the working and washing of the butter, but I can hardly believe that more than three-quarters of an ounce of salt to the pound of butter will ever be required. Consult the merchant

who is selling your goods and follow his advice in this respect. Give him what his trade requires. The old idea that butter must be salted heavily to keep well, especially in the summer, loses its force under the present perfect system of refrigeration.

Now you are ready for packing, and the question of what style of package to use comes before you in a different light than formerly. If our home market were alone to be considered it would not be difficult to settle the matter, but we have reached a point in the dairy industry of this country where the production exceeds the home consumption, and there is every reason to expect a further considerable expansion of the business of making butter. Improved machinery, better stock and more intelligent labor have combined to lessen the cost of the product, and even at the moderately low prices of this season, farmers find their dairy of cows the best and most regular source of income. This means an extension of dairying into the farther west, the Dakotas following the example you have set in Iowa, and the States beyond gradually swinging into line, until the territory clear out to the foothills of the Rockies is dotted over with dairy farms and creameries, which are a natural and necessary appendage. It can, therefore, be seen at a glance that we must look beyond our own borders for an outlet for the product. It may be possible to find a market in Japan or China, or some other country that lies beyond the Pacific, but the more natural markets for us are in Europe, and especially Great Britain, and I am more convinced than ever before, in the nineteen years that I have been in touch with the butter trade of this country, that we can and must establish a regular

and large trade with England. I will refer to this more fully later, but just now let us consider what to pack the butter in for home use.

The white ash Welsh tub is still the popular package. It should be one of the standard makes to hold about 60 pounds net. Creamery butter in smaller tubs has a very limited sale in our market, while the very heavy weight tubs, which are occasionally seen, do not find much favor. The low, broad tub has a squat appearance that is objectionable. Different styles and sizes should not be used in one shipment. Buyers are demanding uniformity in style, and shipments will bring more money if packed with that thought in view. We have had a great deal of trouble this season with moldy tubs, some lots being so bad that the butter had to be turned out and scraped. The tub factories are in a measure responsible for this, as green, sappy staves are too frequently used. But the package should be examined carefully before the butter is put into it, and with proper precaution on the part of the butter maker this trouble can be partially avoided. Just before my leaving New York a prominent merchant told me that he had recently examined a line of his butter that was in cold storage, and was surprised to find that the tubs had become moldy, and it had struck into the butter. "Why," he said, "I bought that butter last June in one of the best sections of Illinois and I had no thought but that it would carry well. The moldy condition will depreciate the value of the butter more than 1 cent a pound. If this element of risk must enter into our calculations, it will change completely the operations in stock for storage." This is not an isolated case, and the matter demands close attention. Take no chances of

developing mold by storing tubs in cellars or other damp places. They should be kept dry and clean, and as free from dust as possible. A bright, attractive appearance helps greatly to sell the butter. Tub should be well soaked before using. In packing be careful to press down the butter so solidly that no holes or deep crevices are left. This is very important, and may explain, in some cases, the short weights which are so often a source of trouble between the creameries and their selling agents. No less important is the necessity of having the tubs full, or so nearly so that there is only room enough on top for the cloth and a light sprinkling of salt; the latter tends to keep the top of the butter moist.

Parchment paper for the lining of butter tubs has grown in favor so rapidly that its general use is now recommended. It keeps the butter cleaner, prevents it from absorbing woody flavors, facilitates stripping, and in keeping out air helps to preserve the butter. Both exporters and home jobbers are giving the preference to butter packed in that way, and the time is not far distant when creameries will have to adopt the paper lining to maintain their position in the front rank. Do not make the mistake of using a poor, thin paper. The cost of the best quality is only 1 cent to 1½ cents a set—enough for one tub. It is generally considered advisable to soak the tub even where the paper is used, especially if the butter is to be carried some time. The paper should also be wet in salt water before it is put into the tub. Cloth should be used on top next to the butter; paper tops have not been satisfactory, as they invariably wrinkle the butter, which gives it a poor appearance. By first using the cloth and then a little salt the

parchment cap might be placed next to the cover. It is important to have the tub covers fit tightly, and they should be so well made that there is no danger of breaking with usual handling. Strips of tin, made especially for the purpose, should be used in fastening on the cover; either three or four of these may be used, but not more. Nails should be used long enough to prevent their coming out while jolting about in transit. The patent iron hooks sometimes used for fasteners are an abomination; they are insecure, and dangerous to anyone handling the tub.

Marking should be done plainly, but do not have any more of it than is absolutely necessary. The old-time method of covering the entire top of the tub with various devices and stencils which were designed to impress the buyer with the belief that the butter was of superior grade, is now of no use. The brand of "Jersey," or "Goshen," or "Elgin" carries no weight with most of the large jobbers; they are looking for quality and go beyond the brand to find it. The section where the butter is made does not enter into the question. Iowa, or Minnesota or Kansas creamery, when properly made, sells as well as that from Illinois or any of the Eastern States. A shipping number, or letter, is a sufficient mark for car-load lots, while for smaller shipments a numbered stencil of the firm the butter is consigned to is all that is needed. If more is added it generally has to be scraped off, particularly when sent out of town or across the water, and that defaces the package.

The square box used for many years in the trade between England and her Australian colonies has been introduced here this season, and while still in rather an experi-

mental stage, enough has been ascertained of its utility, especially for the foreign trade, to warrant the belief that it will come into more general use. Our home jobbers have not taken to the box very kindly as yet, having a regularly established trade for tubs, but there is no deep-rooted prejudice against it. As nearly as I can ascertain between 15,000 and 16,000 boxes have been exported from New York this season, the first lot clearing on June 21. More would have gone abroad but for the difficulty in getting proper boxes, with the right kind of butter in them. One of the first reasons for adopting the box by the colonies was the better stowage on steamers, and consequent saving of freight. This is no advantage in shipping from the United States to Great Britain, as all of our transatlantic lines charge freight on the gross tonnage. But the fact that the butter turns out in a square, slightly mass on the retail counter, from which even cuts can be made, is a strong consideration with English buyers, and this ought to have some force with the trade here. If we are to adopt the box, however, as an export package, every attention to its construction should be given now. I have seen boxes of varying sizes, of all sorts of wood, and from three-eighths to one inch in thickness. The proper size is 12x12x12 inches, inside measurements, and the sides and end pieces should be about five-eighths of an inch in thickness. The wood should be white and odorless. The preference is given to boxes that are put together with nails. In case the butter sticks to the sides it can be loosened a little, but with a dovetailed box this cannot be done, and a serious obstacle is met at once. If the packages were made with a little slant this trouble might

be obviated, but I am told that it is a mechanical impossibility to make a dovetailed box with a slant. The box must be paper lined. Do not think that because you have got a box you can dump anything into it that you like. It has been demonstrated this year that only fine butter sells well in boxes. Remember that England wants light salted, light colored, and dry, waxy, fresh flavored butter.

Let me touch again on our export trade. Realizing the fact of our rapid production and the necessity of fostering the European demand, plans should be made at once to secure a steady and regular market in the large cities and towns of Great Britain. By a further change to winter dairying the season's make in this country will be more evenly distributed, and this will avoid the wide fluctuations in prices, which are a serious source of disturbance to foreign trade. Do not forget that the Englishman is a trader; that he has practically the whole world to draw from, and he buys where he can get goods the cheapest. For this reason we ought to have his attention constantly. Don't tell me that (with our broad prairies, immense grain crops and improved facilities for making and marketing the dairy product) we can compete with any country on which the sun shines. I know that Australia is progressive, and that she is a great dairy country, but she is forty days' sail from London, and it only takes two weeks to put the product of central Iowa on the English markets. The dairy commissioner of Canada has started a movement to build refrigerators at the creameries, and to have a more perfect system of refrigeration, both by rail and on steamers, so that the butter can be landed in Great Britain fresh and in better

condition. Our government might well take hold of these questions, and give timely advice and suggestions before the friends across our northern border have captured the English butter trade as completely as they have the cheese trade.

I have just a word or two more to add, and to which I ask your thoughtful consideration. These are times of concentration of business interests, not in the shape of trusts, but with the thought of economy and most perfect system. There have sprung up in all of our large cities great department stores where nearly every line of goods is handled on a close margin, and the combined business of a dozen stores is brought under one management. To a much smaller extent this might be applied to the creamery system of the west. Iowa is dotted over with nearly 900 creameries, many of which are poorly equipped and struggling for existence. By combining two or three of these into one, with a modern structure, the latest and best machinery, and thoroughly competent men in charge, the cost of making the butter would be considerably reduced. A long line of uniformly fancy quality would be produced, which would not only find more ready sale, but would often command a better price. That which lessens the cost of production, improves the quality and facilitates the better transportation to the distributing and consuming markets at home and abroad will repay the producer far more than we can estimate.

A New Book.

We are in receipt of the advance circular of a new book, written by one of our old students, Mr. H. G. Winkler.

This book is a timely and valuable contribution to our knowledge of growing vegetables under glass, during the winter and spring months. The author has given minute details in every phase of the business, from the construction and management of a small cold frame to the construction and management of extensive commercial forcing houses.

The book is divided into three parts. Part I. contains complete cultural directions for growing the following crops, under glass:

Lettuce.—History of; Temperature of the Lettuce House; Light; Soil; Transplanting; Discussion of the best varieties for Forcing; Preparing and Packing for Market, etc.

Tomatoes.—Traditions. The Tomato House; Sowing the Seed; Transplanting; Final arrangement of Plants; Trellises and Supports; Training; Pruning; Methods of Pollinating; Soil and Fertilizers; Tomatoes as a Spring and early Summer crop. Enemies of Winter Tomatoes and how to Deal with Them.

The following are discussed in the same manner as Lettuce and Tomatoes:

Cucumbers.

Radishes.

Rhubarb.

Asparagus.

Egg-plant.

Celery.

Peas.

Beans.

Part II. contains complete directions for the construction of vegetable forcing houses. The following is a partial list of the subjects of chapters in this division:

Location.

Walls.

Wooden Walls.

Masonry Walls.

The Gutter.

The Roof.

Iron Houses.

Glass and Glazing.

Butted Glass.

Glazing Strips.

Ventilators.

The Sash and Sash Lifters.

Benches.

Solid Beds.

Methods of Heating.

Hot Water Heating.

The Boiler.

Number and position of Radiating pipes.

Expansion Tanks, etc.

Steam Heating—pipes for steam—amount of pipe, etc.

Subirrigation.

The Water Bench, etc.

Part III. contains all the necessary information for constructing and managing Hot Beds and Cold Frames.

We wish to congratulate Mr. Winkler upon the result of this enterprise, especially as to its merits. He shows an ability and a desire which is worthy of praise.

A Model Issue.

Too much space would be required to enumerate all the good things which will appear in the Christmas Number of the HORSE REVIEW, to be issued December 15, and to take the place of the regular issue of that date. Every page will contain a striking feature, and the best writers of America are among the contributors.

In the line of practical horsemanship there will be numerous contributions, chief among which may be mentioned Murray Howe's extensively illustrated article entitled "The Five Free-for-All Pacers of 1896," which will contain a vast fund of information not to be found elsewhere. Mr. H. Easton, who developed and raced the great pacer Badge 2:07¼,

will give his views as to why "Horses Become Great." All regular departments will be presented, and the statistical features will be such as cannot fail to please all breeders.

Four magnificent supplements, suitable for framing, will be part of the number, and the horses will be: Kentucky Union, 2:07 $\frac{1}{4}$, the fastest new 2:10 trotter of 1896; Page, 2:09 $\frac{3}{4}$, the fastest new 2:30 trotter of the year; Ottinger, 2:09 $\frac{3}{4}$ trotting, 2:11 $\frac{1}{2}$ pacing, the champion trotter of the Pacific Coast, and Badge, 2:07 $\frac{1}{4}$, the crack pacing gelding of the year outside of the free-for-all brigade. These will not be bound into the paper, but will be loose. They should please every horseman who is so fortunate as to get them.

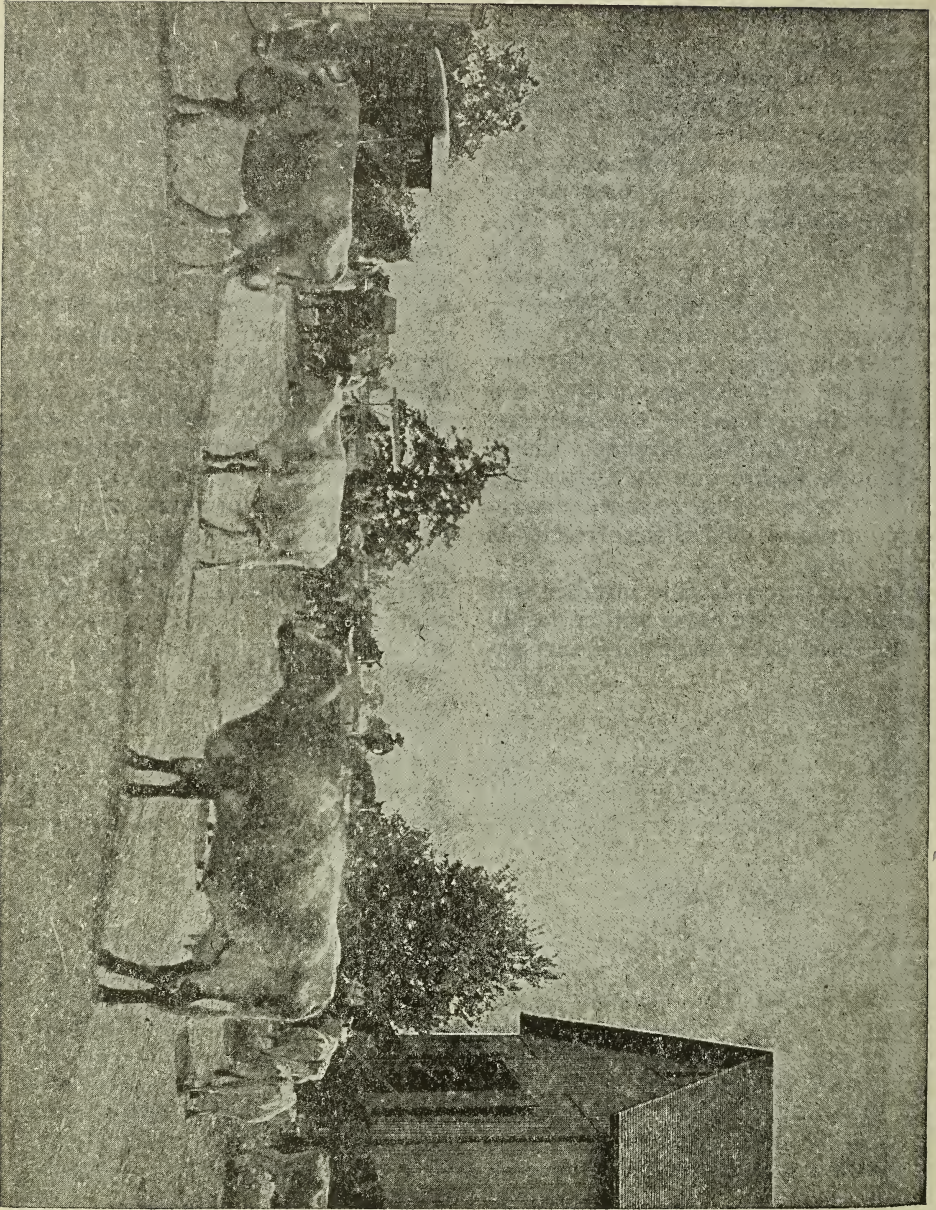
In an artistic way this number will be a model. The cover will certainly be the best ever made for a turf pa-

per, and will be lithographed in colors. Nearly every contribution will be illustrated, and in its entirety the 1896 Christmas HORSE REVIEW should take rank far ahead of any like publication of this or any other year.

Farmers have advantages that other people do not have. When they have some question about their business that they do not understand, they can write to the Rural New-Yorker and get in reply the experience of the best informed men in the country on that particular subject, and it costs only a dollar for the paper a whole year. They can ask all such questions they please. Such information would cost a merchant or a manufacturer or a professional man hundreds of dollars, when they could get it at all. We can send it and THE AGRICULTURAL STUDENT, both one year, for \$1.10.



ADVERTISEMENTS.



UNIVERSITY DAIRY.

There is an average of twenty-six cows actually in milk in the dairy throughout the year. As cows are bought and sold, not the same twenty-six cows are in the herd during the entire year. There are generally also three or four dry cows in the herd. During the last year the cost of food per cow was \$37.83, and the cost for labor was \$61.36, making a total expense per cow, in milk, nearly \$100. The gross income per cow, in milk, was \$147.80, leaving a net income of \$48.61 per cow, or for a herd of twenty-six cows, a net gain of \$1,335.55. It will be remembered that much of the expense for labor was employed in experimental work, which in the practical dairy would not occur.